Glossary

The development of water quality standards and criteria requires clear understanding of key terms and concepts. Foremost is the differentiation between water quality standards and criteria. A *standard* is a legally established state regulation consisting of two parts: (a) designated uses and (b) criteria. A *designated use* is a classification designated in water quality standards for each waterbody or segment that defines the optimal purpose for that waterbody. Examples of designated uses for particular waterbodies are drinking water use and aquatic life use. *Criteria* are statements of the conditions presumed to support or protect the designated use or uses. In practice, if the conditions specified by the criteria are met, the designated use should be supported.

Biocriteria require additional understanding and a common frame of reference for effective development and use in a water quality standards framework. The following definitions provide this frame of reference, and should be carefully considered to ensure consistent interpretation of concepts and terminology.

An *acceptable/unacceptable threshold* is the minimum measured level at which some condition can be differentiated such that the target location is or is not considered reasonable for maintenance of the designated use. The magnitude of impairment is not addressed with a threshold determination.

Ambient monitoring is sampling and evaluation of receiving waters not necessarily associated with episodic perturbations.

An *aquatic assemblage* is an association of interacting populations of organisms in a given waterbody, for example, fish assemblage or a benthic macroinvertebrate assemblage.

Aquatic biota is the collective term describing the organisms living in or depending on the aquatic environment.

An *aquatic community* is an association of interacting assemblages in a given waterbody, the biotic component of an ecosystem (see also *aquatic assemblage*).

Assemblage structure is the make-up or composition of the taxonomic grouping such as fish, algae, or macroinvertebrates relating primarily to the kinds and number of organisms in the group.

Autotrophic refers to the trophic status, the balance between production and consumption where production within the system exceeds respiration.

Autotrophic systems are those systems for which the primary nutrient source of fixed carbon is intrinsic, such as streams in which there is abundant growth of algae or macrophytes.

A *biogeographic region* is any geographical region characterized by a distinctive flora and/or fauna (see also *ecoregion*).

A *bioindicator* is an organism, species, assemblage, or community characteristic of a particular habitat, or indicative of a particular set of environmental conditions.

Biological assessment is an evaluation of the condition of a waterbody using biological surveys and other direct measurements of the resident biota in surface waters.

Biological criteria, or *biocriteria*, are numerical values or narrative expressions that describe the reference biological condition of aquatic communities inhabiting waters of a given designated aquatic life use. Biocriteria are benchmarks for water resources evaluation and management decision making.

Biological integrity is functionally defined as the condition of an aquatic community inhabiting unimpaired waterbodies of a specified habitat as measured by an evaluation of multiple attributes of the aquatic biota. Three critical components of biological integrity are that the biota is (1) the product of the evolutionary process for that locality, or site, (2) inclusive of a broad range of biological and ecological characteristics such as taxonomic richness and composition, trophic structure, and (3) is found in the study biogeographic region.

Biological monitoring, or *biomonitoring*, is the use of a biological entity as a detector and its response as a measure to determine environmental conditions. Toxicity tests and ambient biological surveys are common biomonitoring methods.

A *biological response signature* is a unique combination of biological attributes that identify individual impact types or the cumulative impacts of several human influences.

A *biological survey*, or *biosurvey*, consists of collecting, processing, and analyzing representative portions of a resident biotic community.

A *biomarker* is any contaminant-induced physiological or biochemical change in an organism that leads to the formation of an altered structure (a lesion) in the cells, tissue, or organs of that individual or change in genetic characteristics.

Channelization is the procedure of deepening and straightening stream or river channels through dredging. In some states, channelization includes complete concrete lining of channel bottom, sides, and easements.

A *community component* is any portion of a biological community. The community component may pertain to the taxonomic group (fish, invertebrates, algae), the taxonomic category (phylum, order, family, genus, species, stock), the feeding strategy (herbivore, omnivore, predator), or the organizational level (individual, population, assemblage) of a biological entity within the aquatic community.

A *confidence interval* is an interval that has the stated probability (e.g., 95 percent) of containing the true value of a fixed (but unknown) parameter.

Data quality objectives (DQOs) are qualitative and quantitative statements developed by data users to specify the quality of data needed to support specific decisions; statements about the level of uncertainty that a decisionmaker is willing to accept in data used to support a particular decision. Complete DQOs describe the decision to be made; what data are required, why they are needed, the calculations in which they will be used; and time and resource constraints. DQOs are used to design data collection plans.

Degradation is any alteration of ecosystems such that chemical, physical, or biological attributes are adversely affected.

Degree days are units used in measuring the duration of a life cycle or growth stage of an organism; they are calculated as the product of time and temperature averaged over a specified interval.

A designated use is a classification specified in water quality standards for each waterbody or segment relating to the level of protection from perturbation afforded by the regulatory agency.

Diversity is the absolute number of species in an assemblage, community, or sample; species richness (see also *taxa richness*).

Ecological assessment is a detailed and comprehensive evaluation of the status of a water resource system designed to detect degradation and, if possible, identify the causes of that degradation.

Ecological health is the degree to which the inherent potential of a biological system is realized, the dynamic equilibrium of system processes is maintained, and a minimal amount of external support for management is needed.

Ecological integrity is the condition of an unimpaired ecosystem as measured by combined chemical, physical (including habitat), and biological attributes.

Ecoregions, or *regions of ecological similarity,* are defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

Ecoregionalization — See *regionalization.*

Elements are the richness of items that make up biological systems, measured as number of kinds.

Generalists are organisms that can utilize a broad range of habitat or food types.

Heterotrophic input refers to the trophic status, the balance between production and consumption where respiration within the system exceeds production.

Heterotrophic systems are those systems for which the primary nutrient source of fixed carbon is extrinsic, such as streams for which the main source of organic input is from riparian vegetation in the form of leaf litter and woody material.

Historical data are datasets existing from previous studies, which can range from handwritten field notes to published journal articles.

Hyporheic pertains to saturated sediments beneath or beside streams and rivers.

An *impact* is a change in the chemical, physical (including habitat), or biological quality or condition of a waterbody caused by external sources.

An *impairment* is a detrimental effect on the biological integrity of a waterbody caused by an impact that prevents attainment of the designated use.

Level of uncertainty pertains to the confidence, or lack thereof, that data from an assessment will support the conclusions.

Macroinvertebrates are animals without backbones of a size large enough to be seen by the unaided eye and which can be retained by a U.S. Standard No. 30 sieve (28 meshes per inch, 0.595 mm openings).

Macrophytes are large aquatic plants that may be rooted, unrooted, vascular, or algiform (such as kelp); includes submerged aquatic vegetation, emergent aquatic vegetation, and floating aquatic vegetation.

A *metric* is a calculated term or enumeration representing some aspect of biological assemblage structure, function, or other measurable aspect; a characteristic of the biota that changes in some predictable way with increased human influence; combinations of these attributes or metrics provide valuable synthetic assessments of the status of water resources.

Minimal effluent dilution occurs in low flow conditions in which there is a lower quantity of water and thus a decreased ability for receiving waters to lower concentration levels of discharged compounds.

Minimally impaired is a term used to describe sites with slight anthropogenic perturbation relative to the overall region of study.

Mutualism is a form of symbiotic relationship in which both organisms benefit, frequently entailing complete interdependence.

Narrative biocriteria are general statements of attainable or attained conditions of biological integrity and water quality for a given use designation (see also *biocriteria*).

Nonpoint source is the origin of pollution in diffuse sources such as agriculture, forestry, and urbanization. Such pollution is transported by rainfall or snowmelt runoff carrying pollutants overland or through the soil.

Numeric biocriteria are numerical indices that describe expected attainable community attributes for different designated uses (see also *biocriteria*).

Organic pollution results from the presence of living substances in a stream or other waterbody at higher than natural background levels because of anthropogenic activities.

Paleoecological data are records derived from ancient or fossil remains discovered in lake sediments, including, for example, the fossilized remains of diatoms, pollen, seeds, or arthropod exoskeletal fragments. (Arthropoda are the phylum of invertebrate animals with jointed limbs, such as crustaceans and spiders.)

Performance effect criteria are judgment criteria that weigh the effectiveness of a project activity or function; determination of proper functioning.

Periphyton is a broad organismal assemblage composed of attached algae, bacteria, their secretions, associated detritus, and various species of microinvertebrates.

Processes (or biotic processes) pertain to ecological and evolutionary activities that naturally organize and regulate biological systems at all levels from genetic to landscape; examples are production, food acquisition, biotic interactions, and recruitment.

Production is the increase in biomass (somatic growth plus reproduction) of an individual, population, or assemblage.

Point source is the origin of pollutant discharge that is known and specific, usually thought of as effluent from the end of a pipe.

A *population* is an aggregate of individuals of a biological species that are geographically isolated from other members of the species and are actually or potentially interbreeding.

Quality assurance (QA) includes quality control functions and involves a totally integrated program for ensuring the reliability of monitoring and measurement data; the process of management review and oversight at the planning, implementation, and completion stages of environmental data collection activities. Its goal is to assure that the data provided are of the quality needed and claimed.

Quality control (QC) refers to the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurements process; focuses on the detailed technical activities needed to achieve data of the quality specified by data quality objectives. Quality control is implemented at the bench or field level.

Range control refers to quality control activity through which measurement values are kept within the range of natural or normal variability; control of operator variability.

Reasonably attainable refers to the ability of an aquatic resource to attain its expected potential.

A *reference condition* is the set of selected measurements or conditions of minimally impaired waterbodies characteristic of a waterbody type in a region.

A *reference site* is a specific locality on a waterbody which is minimally impaired and is representative of the expected ecological integrity of other localities on the same waterbody or nearby waterbodies.

Regionalization or *ecoregionalization* is a procedure for subdividing a geographic area into regions of relative homogeneity in ecological systems or in relationship between organisms and their environment.

Regulated flow of a stream or river is that for which the quantity of water moving within its banks is a function of anthropogenic activity, usually associated with dams and reservoirs.

Residuals are the differences between a value predicted by regression and an observed value.

Respiration is the energy expenditure for all metabolic processes. Matter and energy are returned to the environment by respiration; matter as CO_2 and water, and energy as heat.

A *riparian zone* is an area that borders a waterbody.

Streams, as defined for the purpose of this document, are small lotic systems that can be waded by field investigators.

Targeted assemblage approach refers to an assessment procedure that has as its focus of sampling a selected component of the biological community.

A *targeted community segment* is the component of the community, such as a taxonomic category, trophic level, guild, or other designation, that is the focus of a bioassessment.

Taxa richness refers to the number of distinct species or kinds (taxa) that are found in an assemblage, community, or sample (see also *diversity*).

Termination control points are quality control elements that indicate when and where nonvalid procedures are being used or data are being collected and indicate necessary changes in procedures.

A *test site* is the location under study of which the condition is unknown and suspect of being adversely affected by anthropogenic influence.

A *vegetated buffer zone* is a planted or naturally vegetated strip of land between some feature (usually a waterbody) and another landform or habitat that has been altered by human activity (e.g., agricultural fields, roadways, asphalt parking lots, residential areas).

A *water resource assessment* is an evaluation of the condition of a waterbody using biological surveys, habitat quality assessments, chemical-specific analyses of pollutants in waterbodies, and toxicity tests. These environmental assessments may be diverse or narrowly focused depending on the needs of the evaluation, and the probable sources of degradation.

Zooplankton refers to animals which are unable to maintain their position or distribution independent of the movement of water or air.